



INTEC
CONTROLS



PolyGard® SPC-1130 1CFT

Nitrogen dioxide (NO₂) gas detection and control system
serial no. SPC 1130-001

User Manual

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Nitrogen dioxide (NO₂) gas detection and control system

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Nitrogen dioxide (NO₂) gas detection and control system

1 General Overview

The PolyGard® NO₂ analog single point controller is used for detection of nitrogen dioxide in the ambient air to warn of the presence of nitrogen dioxide gas and to control ventilation systems.

2 Description

Gas sensing

The sensor portion of the PolyGard® NO₂ analog single point controller is a micro-fuel cell, which is completely sealed. The measurement is a gas-in-liquid chemical reaction rather than a surface area measurement. With no surface area to coat, this sensor retains its sensitivity to nitrogen dioxide even after prolonged exposure to clean air.

The cell consists of a diffusion barrier, O-ring seal, electrolyte reservoir and three electrodes: sensing, counter and reference. The target gas, nitrogen dioxide, enters the cell through a diffusion barrier. The chemical process of the measurement is one of oxidation where one molecule of the target gas is exchanged for one molecule of oxygen. The reaction drives the oxygen molecule to the counter electrode, generating a DC microampere signal between the sensing and counter electrodes. This signal is linear to the volume concentration of the sensed gas rather than the partial pressure.

The integrated two-wire transformer converts this DC microampere signal to a standard 4-20 mA signal. In some cases, biasing is required to maintain a voltage differential between the reference and sensing electrode in order to facilitate the necessary reaction in the cell.

The transmitter electronics will provide the necessary bias voltage when configured for one of these sensor types. Most sensors produce a small amount of baseline current in clean air. This is adjusted out with the zero potentiometer on the transmitter.

This oxidation at the electrodes causes wear of the sensor. Typical life for this sensor is approximately two years in normal operation. This will vary somewhat from sensor to sensor, with some working lifetimes less than two years and some greater than 2 years. This wear also changes the characteristics of the sensor, requiring periodic recalibration. It is recommended that the sensor accuracy be verified every six months and recalibrated as necessary.

Relay output

The controller output provides two (2) adjustable trip/setpoints within the sensing range. If the NO₂ concentration exceeds any trip/setpoint value the respective alarms will be activated. The low or high alarm trip/setpoint level correspond to the relay outputs 1K1 (R1) and 1K2 (R2). The output relay R3 can be assigned to either low alarm or high alarm.

The controller has a self-diagnostic to detect any power supply voltage or sensor failures. When a failure occurs it triggers relay output R4. The fail-safe relay R4 will close in case of loss of supply voltage or sensor failure.

Analog output

The 4-20 mA output is linear and represents the range of 0-10 ppm actual sensor proportional value. This signal can be used with any external DDC/PLC control or automation system.

Test button

With this button pushed, it simulates the maximum gas concentration. Low and high alarms will be activated and the display will show the maximum value.

Manual override of low alarm relay

Manual switch for “Auto” or “On” function of the relay 1K1 (R1)

Switch position:

Auto = alarm relay 1K1 normal operation

On = alarm relay 1K1 manually on

Caution!

Replacement sensor elements, which are not bias types, are shipped with a tiny spring of wire shorting the sensor and reference electrodes.

This spring **MUST BE REMOVED** prior to installing the element into the sensor assembly.

Optional Display

3.5 digits display of concentration

LED power:	green	Power on, and normal operation
	red	Failure operation

LED alarm:	orange	Low alarm level active
	red	Low and high alarm level active

Button “Reset 2 nd Alarm”	Reset high alarm, when relay is set to latched
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Button “Reset Audible”	Reset internal horn and relay R3 for remote alarm
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Optional time delay relay for low alarm

Time delay relay for delayed activation of relay 1K1

RTE-P11 analog timer = on-delay, adjustable from 0.1 min to 10 min

3 Installation

Note:

- Avoid any force (e.g. by thumb) during operation or installation on the sensor element. This could destroy the element.
- Electronics can be destroyed through static electricity. Therefore, do not work on the equipment without a wrist strap connected to earth ground or standing on conductive floor.

3.1 Mounting locations

- The specific weight of nitrogen dioxide is heavier than that of air (factor 1.59).
- Location of the SPC 1130 must conform to the layout of the area being monitored.
- Disregard the ventilation ratio! Do not mount SPC 1130 in the center of the airflow. In larger rooms, it might be necessary to install two or more SPC 1130 where there is not adequate air movement. Do not mount in corners or directly in front of air inlets (e.g. doors, windows, open ramps, dampers, etc.). In areas with undefined air movement, it might be necessary to distribute several SPC 1130 in a vertical and horizontal direction over the whole area to be monitored.
- Avoid locations where water, oil etc. may influence proper operation and where mechanical damage might be possible.
- Mounting height is one foot (0.3 m) above floor.
- Provide adequate space around SPC 1130 for maintenance and calibration work.

3.2 Enclosure

- The door of the enclosure is lockable with supplied key (5/16 in. (8 mm) triangle key).
- Use the provided template for locating position of wall mounting holes.
- Screw the enclosure vertically on wall. (see Fig. 2, page 18).
- When wiring is completed, put back the wire track cover and close the door of the enclosure. (see Fig. 1, page 17).

4 Electrical Connection

4.1 Instructions

Note:

Electrostatic discharge (ESD) may damage electronic components. During wiring, open the cover only when completely grounded via grounding strap or standing on conductive floor.

- Connections should be made without any power applied to conductors.
- Installation of the electrical wiring should be according to the connection diagram and only performed by a trained specialist.
- For the 4-20 mA analog output signal use shielded cable to avoid any influence from external interference.
- Recommended cable: 18 AWG shielded, maximum resistance 20.8 Ω/1000 ft (73 Ω/1000 m)
- Cable for power and relay outputs do not need to be shielded.

Power terminal block X1

Connector H	120 VAC 50/60Hz (24V AC/DC without transformer)
Connector N	0 VAC/DC
Connector G	Earth ground

Motherboard terminal strip X2

Connector 1	4-20 mA sensor output signal (common)*
Connector 2	4-20 mA sensor output signal (positive)
Connector 3	Power supply 24 VAC
Connector 4	0 VAC/DC
Connector 5	Power supply 24 VDC (19 - 28 VDC)
Connector	

*** Note:**

When the SPC analog output signal is connected to an external controller, the controller's analog input must provide isolation for the 4-20 mA signal. If the 4-20 mA signal is used, then remove Jumper JP1 located on the motherboard.

Motherboard terminal strip X3 (relay output without optional time delay relay 1K1):

Connector 1-2	R1, low alarm relay activates the 1K1 relay via internal wiring	
Connector 3	NO	R2, high alarm relay activates the 1K2 relay via internal wiring
Connector 4	NC	
Connector 5	COM	
Connector 6-7	R3, potential free contact for remote alarming	
Connector 8-9	R4, potential free contact for remote fail-safe alarming	

Low alarm relay socket 1K1 (DPDT)

Contact set 1 of DPDT	Contact set 2 of DPDT	
Connector 5	Connector 8	NO
Connector 1	Connector 4	NC
Connector 9	Connector 12	COM

High alarm relay socket 1K2 (DPDT)

Contact set 1 of DPDT	Contact set 2 of DPDT	
Connector 5	Connector 8	NO
Connector 1	Connector 4	NC
Connector 9	Connector 12	COM

Optional low alarm time delay relay socket 1K1 (DPDT)

Contact set 1 of DPDT	Contact set 2 of DPDT	
Connector 6	Connector 3	NO
Connector 5	Connector 4	NC
Connector 8	Connector 1	COM

4.2 Wiring connection

Static electricity (see section 4.1).

- Open the door of the enclosure.
- Pull cables via the conduit openings into the enclosure, and connect cable leads to the appropriate terminal connectors.

5 Start-up Operation

Only trained technicians should perform the following:

- Check mounting location.
- Check power voltage.
- Check for correct sensor element (7 NDH) at sensorboard terminal X3 PCB EC-C.
- Check and/or select the appropriate jumpers for remote alarm function, relay R3.
(see section 5.5, motherboard jumper selection table).
- Check and/or select the appropriate jumper for failure function, relay R2.
(see section 5.5, motherboard jumper selection table).
- Check and/or select the appropriate jumper for latched function, relay R2.
(see section 5.5, motherboard jumper selection table).
- Check and/or adjust trip/setpoints for low and high alarm levels.
(see section 5.1, motherboard potentiometers R31 and R32).
- Check and/or put switch into "Auto" position, manual override of low alarm.
- Verify sensor/transmitter operation by measuring approximately 200 mV (about 0 ppm NO₂) on sensor-board terminal -X6 and +X6.

Required instruments to start-up and calibrate the SPC:

- Test gas bottle with synthetic air.
- Test gas bottle with 5 ppm NO₂.
- Gas pressure regulator with flow meter to control the gas flow at 300 ml/min.
- Sensor head calibration adapter with tubing.
- Digital voltmeter with a range of 0-2 VDC and 0-10 VDC, accuracy 1%.
- Small screwdriver.

Note:

Please observe proper handling procedures for test gas bottles!

5.1 Set trip/setpoints

5.1.1 Set low and high trip/setpoints without optional digital display

Set low trip/setpoint

- Connect a digital voltmeter to test jacks J1 (red) and JM (black) on the motherboard with a range selected that will display 10 VDC maximum.
- Adjust the low trip/setpoint voltage, with potentiometer "R31" at the motherboard, until the signal reads the appropriate mVDC \pm 2 mV (see section 5.1.2, calculation for trip/setpoint control voltage).

Set high trip/setpoint

- Connect a digital voltmeter to test jacks J2 (red) and JM (black) on the motherboard with a range selected that will display 10 VDC maximum.
- Adjust the high trip/setpoint with potentiometer "R32" at the motherboard until the signal reads the appropriate mVDC \pm 2 mV (see section 5.1.2, calculation for trip/setpoint control voltage).

5.1.2 Control trip/setpoint voltage calculation

$$= \frac{0.48 \text{ V} \times \text{trip/setpoint (ppm)}}{\text{(ppm)}} + 1.20 \text{ VDC}$$

Example

Trip/setpoint value	2 ppm
Control voltage	2.16 V

$$\frac{0.48 \text{ (V)} \times 2 \text{ (ppm)}}{\text{(ppm)}} + 1.20 \text{ (V)} = 2.16 \text{ V}$$

5.1.3 Set low and high trip/setpoints with optional digital display

- Set display jumper on displayboard into position "JP1" to "JP 1.2". This will provide a display value with +/- sign.

Set low trip/setpoint

- Set mode-operating switch "S1" on displayboard into position 1 (far left position). The digital display indicates the low trip/setpoint value.
- Adjust the low trip/setpoint with potentiometer "R31" on the motherboard. The trip/setpoint value can be read on the digital display.

Set high trip/setpoint

- Set mode-operating switch "S1" on displayboard into position 2 (second position from the left). The digital display indicates the high trip/setpoint value.
- Adjust the high trip/setpoint with potentiometer "R32" on the motherboard. The trip/setpoint value can be read on the digital display.
- Set mode-operating switch "S1" on displayboard into position 4 (far right position). This is the normal operating mode (see Fig. 5, page 18).
- Set display jumper on displayboard back into position "JP1" to "JP1.1". This provides a display value without any +/- sign.

5.2 Select switching differential of the trip/setpoints

Individual switching differentials can be selected per trip/setpoint via jumpers "JP6" and "JP8" on the motherboard, either 4% or 10% differential of full transmitter range (see section 5.5, motherboard jumper selection table). For example, with factory standard range 0-10 ppm NO₂, 4% differential = 0.4 ppm, and 10% differential = 1.0 ppm.

5.3 Calibration

Note:

If calibration is necessary, the sensor element must be powered and be fully stabilized for at least 4 hour.

Zero adjustment

Zero-point calibration (4 mA): (After sensor warm-up)

- Connect digital voltmeter to test pins - and + at sensorboard (with a range selected that will display 2 VDC max.).
- Connect the calibration adapter to sensor element.
- Apply sensor element zero calibration gas, (300 ml/min; 14.5 psi ± 10%), or other clean air source.
- Wait two minutes until the signal is stable; adjust signal with zero potentiometer "Zero" until the signal is 200 mV ± 2 mV and stable (sensorboard).
- Remove calibration adapter carefully by turning lightly.

Span adjustment

Note:

NO₂ calibration gas is toxic; never inhale the gas!

Symptoms: Dizziness, headache and nausea.

Procedure if exposed: Bring into fresh air at once, consult doctor.

- Connect calibration adapter to the sensor element.
- Apply sensor element span calibration gas (5 ppm NO₂), (300 ml/min; 14.5 psi ± 10%).
- Wait two minutes until the signal is stable, adjust signal with span potentiometer "Span" until the signal reads the appropriate mVDC (± 3 mV, see calculation for control voltage 5.3.1) and is stable (sensorboard).
- Remove calibration adapter with a careful light turn. Inspect the seating of the sensor element!

5.3.1 Control span voltage calculation

$$\frac{800 \text{ (mV)} \times \text{test gas concentration (ppm)}}{\text{Sensing range NO}_2 \text{ (ppm)}} + 200 \text{ (mV)}$$

Example

Sensing range NO ₂ concentration	10 ppm
Test gas concentration	5 ppm
Control voltage	600 mV

$$\frac{800 \text{ (mV)} \times 5 \text{ (ppm)}}{10 \text{ (ppm)}} + 200 \text{ (mV)} = 600 \text{ mV}$$

5.4 Calibration of digital display range (optional display)

Note:

The display range is factory set and normally does not require any field adjustment.

Adjustment can only be made when the sensorboard test pins "X6+" and "X6-" read 200 mV. This represents a 0 ppm NO₂ value.

Calibrate maximum display range of 10 ppm NO₂

- Connect digital voltmeter to test pins "J3+" and "J4-" on the displayboard with a range selected that will display 300 mVDC maximum.
- Adjust the maximum display range voltage with potentiometer "R31" on the displayboard until the signal reads 193 mVDC ± 1 mVDC.

Calibrate zero point display of 0 ppm NO₂

- Adjust the zero point with potentiometer "R32" on the displayboard until the digital display reads 0 ppm.

5.5 Motherboard jumper selection table

Function	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Element	Factory Set
4-20 mA signal for external use	X		Jumper JP1	
4-20 mA not used		X		<input checked="" type="checkbox"/>
Relay R3 will be active with low alarm		X* ¹	Jumper JP3	<input checked="" type="checkbox"/>
Relay R3 will be active with high alarm		X* ¹	Jumper JP4	
Relay R3 will be not active		X* ¹	Jumper JP5	
System failure also activates high alarm		X	Jumper JP9	
System failure does not activate high alarm	X			<input type="checkbox"/>
High alarm without latch function		1-2	Jumper JP12	<input checked="" type="checkbox"/>
High alarm with latch function		2-3		
With optional digital display	X		Jumper JP2	<input checked="" type="checkbox"/>
Without optional digital display		X		<input checked="" type="checkbox"/>
Switching differential of low trip/setpoint, 4%		1-2	Jumper JP6	<input checked="" type="checkbox"/>
Switching differential of low trip/setpoint, 10%		2-3		
Switching differential of high trip/setpoint, 4%		1-2	Jumper JP8	<input checked="" type="checkbox"/>
Switching differential of high trip/setpoint, 10%		2-3		
Internal function		X	Jumper JP7* ²	<input checked="" type="checkbox"/>
Internal function		2-3	Jumper JP10* ²	<input checked="" type="checkbox"/>
Internal function		1-2	Jumper JP11* ²	<input checked="" type="checkbox"/>

Note:

*¹ Only one of the three jumpers can be installed.

*² Do not change the factory jumper position setting.

5.6 Displayboard jumper selection table

Function	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Element	Factory Set
Display value without sign +/-		X	Jumper JP1.1	
Display value with sign +/-		X	Jumper JP1.2	<input checked="" type="checkbox"/>
Button "Reset 2 (high) alarm" enabled		X	Jumper JP12	<input checked="" type="checkbox"/>
Button "Reset 2 (high) alarm" disabled	X			
Internal function		X	Jumper JP7 ¹	<input checked="" type="checkbox"/>

¹ Do not change the factory jumper position setting

6 Inspection and Service

6.1 Inspection

Inspection and service of the single point controller should be done by a trained technician and executed on a periodic interval. It is recommended that the sensor operation be verified at least every six months.

6.2 Calibration sensor

(See part 5.3)

- Service at periodic intervals is to be decided by the person responsible for the gas detection system.
- If span calibration voltage of 600 mV (see note below) is no longer attainable when applying 5 ppm nitrogen dioxide in air, then the sensor element has to be replaced. After the sensor element has been replaced, a calibration is required.

Note:

If using a different level of span test gas ppm, or different sensor range, then the mV needs to be calculated.

6.3 Replacing sensor element

Static electricity (see section 4.1).

Sensor should always be installed without power applied, remove fuse "1F1".

- Unplug old sensor element out from the sensorboard.
- Take new sensor element out of original packing and remove the shorting wire on the sensor element contacts.
- Plug sensor element in the connector X3 at the sensorboard.
- After sensor warm-up, turn potentiometer "Span", located on sensorboard, to its center position. (Turn the pot 25 rotations counter-clockwise, then 11 rotations clockwise to be centered.)
- Calibrate (see section 5.3).

7 Troubleshooting

7.1 Diagnostics

Trouble	Reason	Solution
No indication of power (optional with display), and/or test button does not function	Power not applied	Measure power on terminal block X1 terminal H / N for 120 VAC (24
	Fuse failure	Check miniature fuses 1F1, 1F2 or F1 on motherboard
	Interruption in the cable connection between motherboard and displayboard	Check cable connections for tight fit
	Failure on displayboard	Replace displayboard
No indication value at digital display	Mode operating switch S1 on displayboard, position 3 = OFF	Set switch in position: 1 = low trip/setpoint 2 = high trip/setpoint 4 = sensed value
	Interruption in the cable connection between motherboard and displayboard	Check cable connections for tight fit
	Failure on displayboard	Replace displayboard
Cannot calibrate sensorboard	Interruption in the cable connection between motherboard and displayboard	Check cable connections for tight fit
	Sensor sensitivity too low	Replace sensor
	Failure on sensorboard	Replace sensorboard
Cannot set trip/setpoints	Trip/setpoint values are set too high	Adjust trip/setpoint values again (see section 5.1 to 5.3)
	Failure on motherboard	Replace motherboard
Fail-safe alarm	Interruption of sensor cable or sensor sensitivity too low	Check cable connection, or if necessary replace and calibrate sensor
	Control span voltage lower than 200mV	Recalibrate the sensor, or if necessary replace sensor element

8 Cross-sensitivity Data

This table shows the typical response to be expected from the sensor when exposed to the following gases.

Gas	Chemical mark	Gas concentration	Tolerance ppm NO ₂
Carbon monoxide	CO	300 ppm	0 ppm
Chlorine	Cl ₂	1 ppm	~ 1 ppm
Ethylene	C ₂ H ₄	100 ppm	0 ppm
Hydrogen	H ₂	100 ppm	0 ppm
Hydrogen chloride	HCl	5 ppm	0 ppm
Hydrogen cyanide	HCN	10 ppm	0 ppm
Hydrogen sulphide	H ₂ S	15 ppm	- 1.5 ppm
Nitric oxide	NO	35 ppm	≤ 7 ppm
Sulphur dioxide	SO ₂	5 ppm	0.05 ppm

9 Specifications

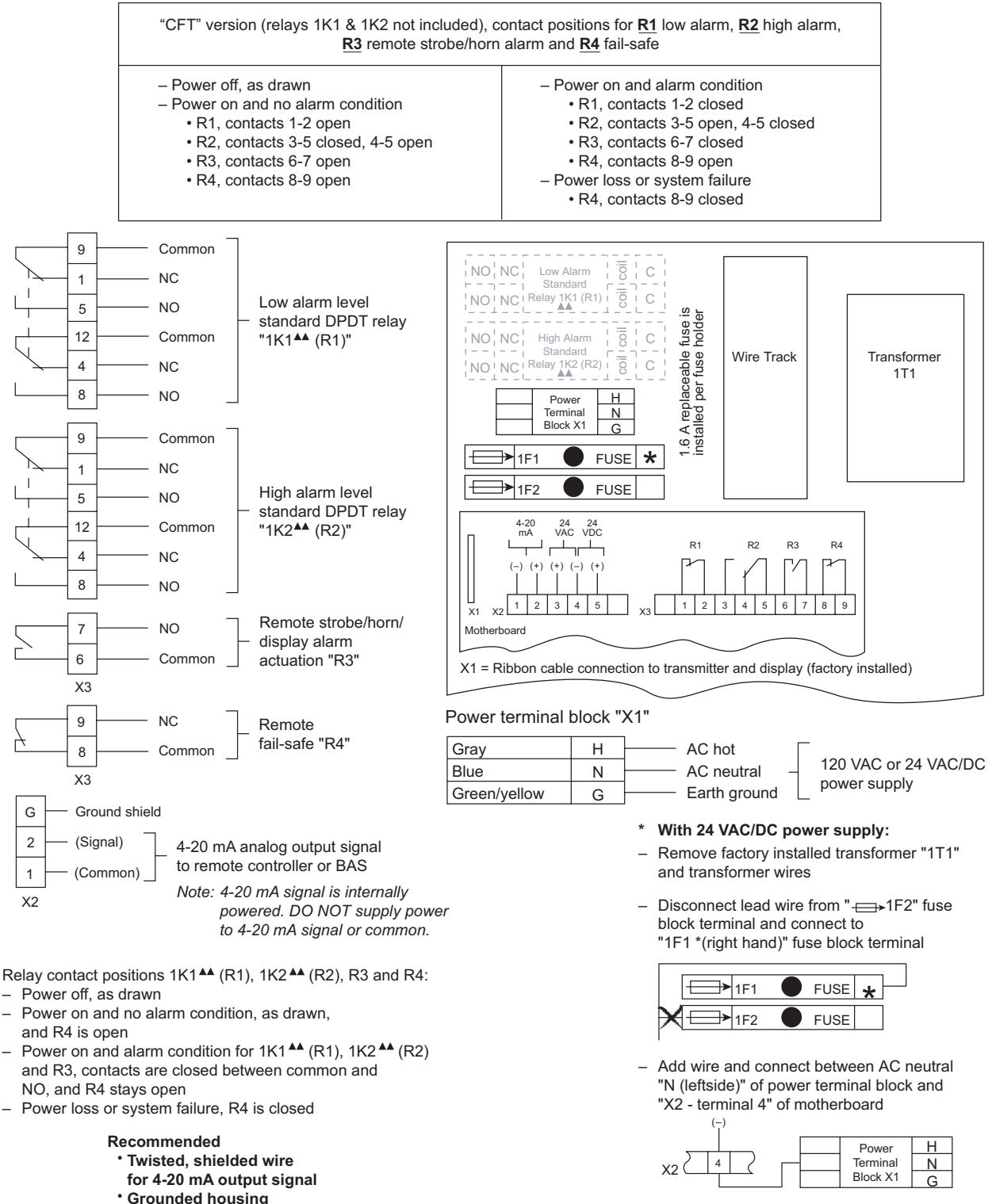
Electrical	
Power supply:	120 VAC, -10%/ +20%, 50/60 Hz, or 24 VAC/DC, -10%/ +20%, without built-in transformer resettable 1.6 A fuse
Power consumption:	0.6 A (15 VA), max.
- w/optional heater	1.6 A (39 VA), max.
RFI/EMI protection	5.0 W @ 1ft. (0.31 m) radiated
Sensor Performance	
Gas detected	Nitrogen dioxide (NO ₂)
Sensor element	Electrochemical, diffusion
Range	0 - 10 ppm factory set 0 - 10 to 0 - 20 ppm, adjustable via calibration
Stability & resolution	± 0.1 ppm of reading
Repeatability	2% of reading
Long term output drift	< 2% signal loss/month
Response time	t ₉₀ ≤ 40 sec.
Sensor life expectancy	2 years, normal operating environment
Sensor coverage	4,000 sq.ft. (372 m ²) to 6,000 sq.ft. (558 m ²) under "ideal conditions"
Installation Location	
Mounting height	1 ft. (0.3 m) above floor
Relay outputs	
Low alarm (1K1)	DPDT, 10 A (optional time delay relay, 10 A) potential free, 250 VAC
High alarm (1K2)	DPDT, 10 A, potential free, 250 VAC max.
Remote alarm (R3)	SPST, 5 A, potential free, 250 VAC max.
Fail-safe (R4)	SPST, 5 A, potential free, 250 VAC max.
Type of Control	
General	Two-stage, low and high alarm Trip/setpoints
Trip/setpoints	
- Low alarm	2 ppm NO ₂ (factory calibrated, user adjustable)
- High alarm	5 ppm NO ₂ (factory calibrated, user adjustable)
Switching differential	4 % or 10% of sensing range, selectable
Analog output signal	4-20 mA for external controller (the controller's analog input must provide isolation for the 4-20 mA signal), load > 50 kOhm
Audible alarm	90 dB, enabled or disabled, selectable
Visual Indications and Reset Push Buttons, optional	
Digital display	3.5 digit, ppm reading
Power/operating status LED	Green = power on / Red = failure
Alarm status LED	Orange = low alarm / Red = high alarm
Reset 2 nd alarm button	LED on = w/high alarm on (only w/latched relay configuration)
Reset audible button	LED on = w/internal horn and/or relay R3 for remote alarm is on
Alarm acknowledgement / reset function	Low alarm: auto reset High alarm: auto reset or manual reset, selectable

Operating Environment	
Working temperature	23 °F to 104 °F (-5 °C to + 40 °C)
Storage temperature	23 °F to 86 °F (-5 °C to + 30 °C)
Humidity	15 to 95% RH non-condensing
Pressure range	Atmospheric ±10%
Optional	
Heater, built-in	For low temperature environment
Ambient temperature	-22 °F to 104 °F (-30 °C to 40 °C)
Thermostatic control	32 °F (0 °C) ± 5 °F (3 °C)
Physical Characteristics	
Enclosure material	Steel case
Enclosure color	Light beige
Protection	NEMA 4 (IP 55)
Installation	Wall (surface) mounted
Dimensions, enclosure (HxWxD)	9.06 x 8.27 x 5.6 in. (230 x 210 x 142 mm)
Dimensions, splash guard (HxDia.)	0.63 x 2.56 in. (16 x 65 mm)
Cable entry	3 holes for ½ in. conduit, covered
Wire connection	Terminal blocks, screw type for lead wire
Wire size	Min. 24 AWG (0.25 mm ²) max. 14 AWG (2.5 mm ²)
Weight	8.8 lbs. (4.0 kg)
Approvals/Listings	
- unit	City of Los Angeles approval*
	CE
	EMV-compliance 89/336/EWG
- relays	UL-recognized, CSA-certified, TÜV
- transformer	UL-listed, CSA-certified
Warranty	Two years material and workmanship

* = Pending

10 Wiring Configuration and Enclosure Dimensions

Wiring Configuration Fig. 1



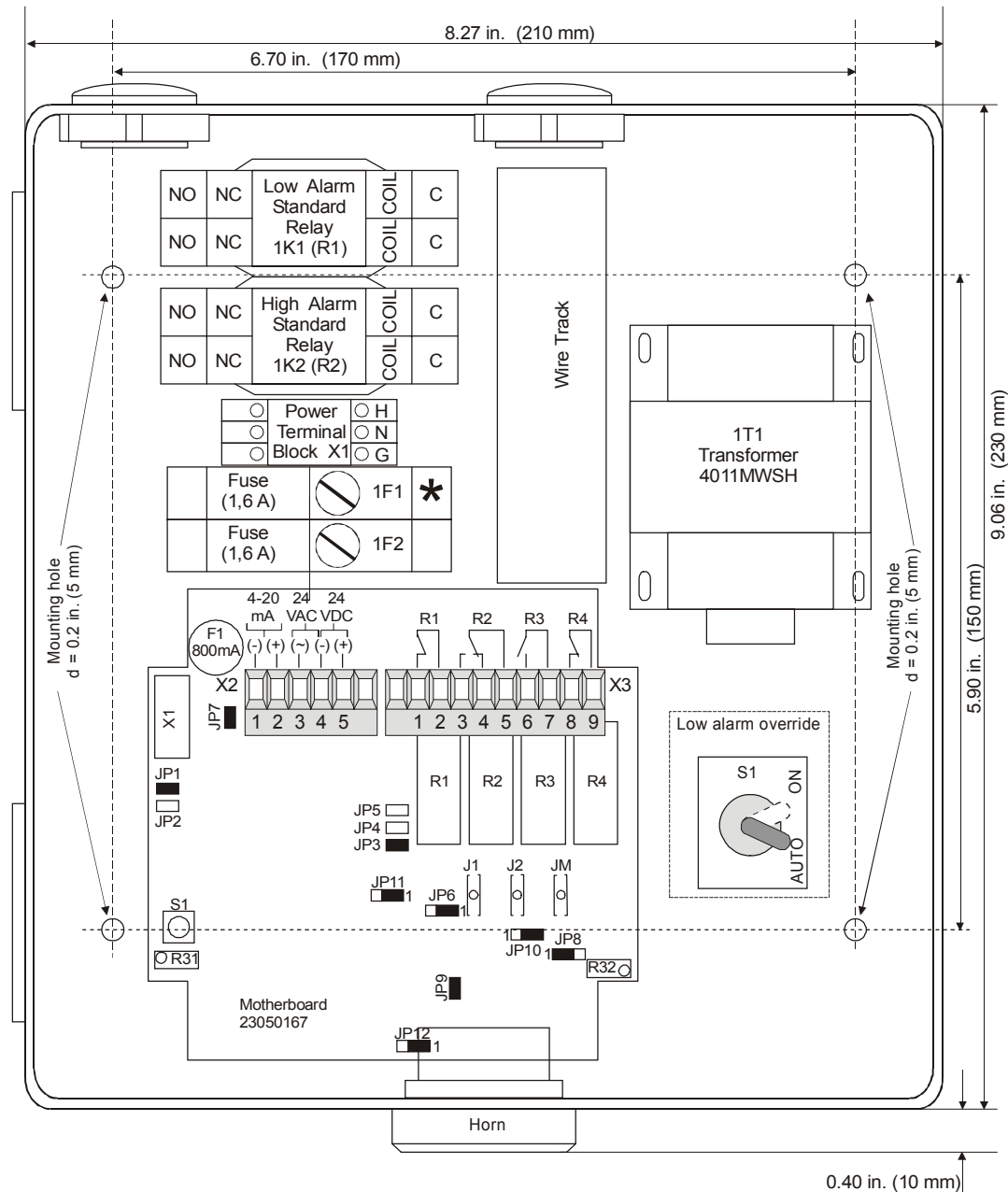
Relay contact positions 1K1▲▲ (R1), 1K2▲▲ (R2), R3 and R4:

- Power off, as drawn
- Power on and no alarm condition, as drawn, and R4 is open
- Power on and alarm condition for 1K1▲▲ (R1), 1K2▲▲ (R2) and R3, contacts are closed between common and NO, and R4 stays open
- Power loss or system failure, R4 is closed

Recommended

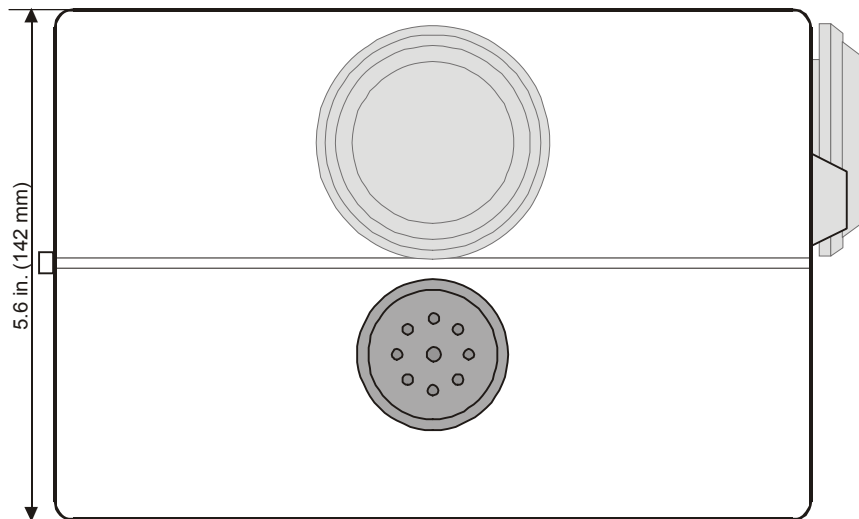
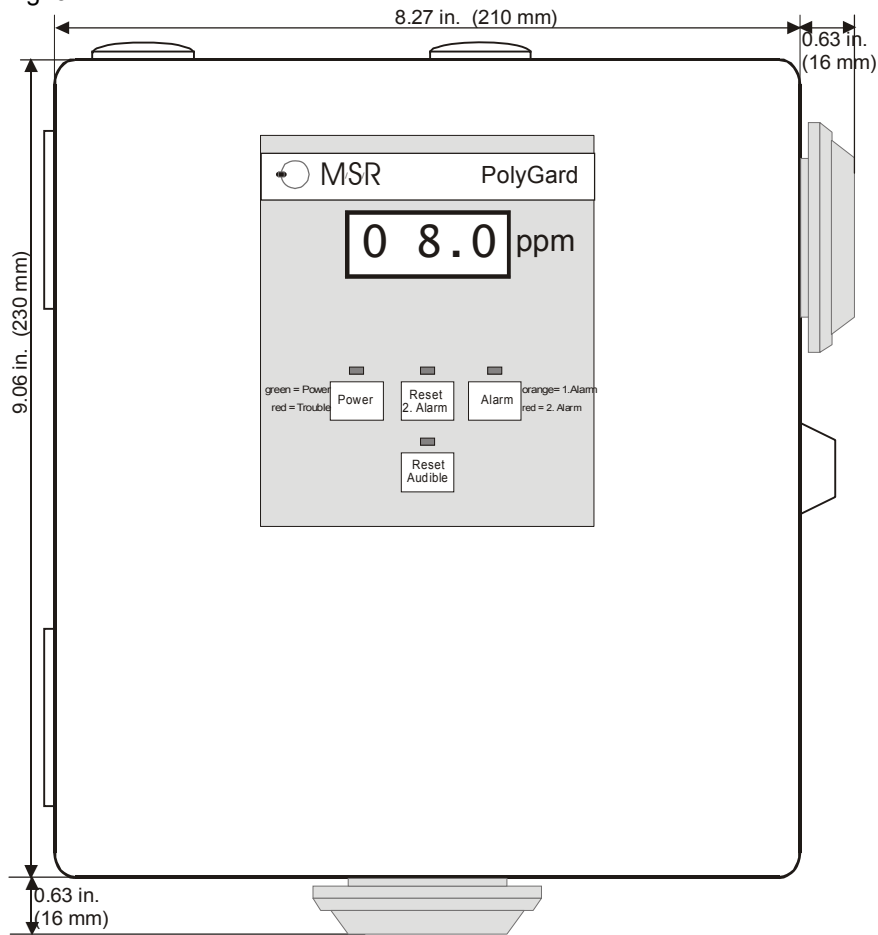
- Twisted, shielded wire for 4-20 mA output signal
- Grounded housing

Assembly
Fig. 2



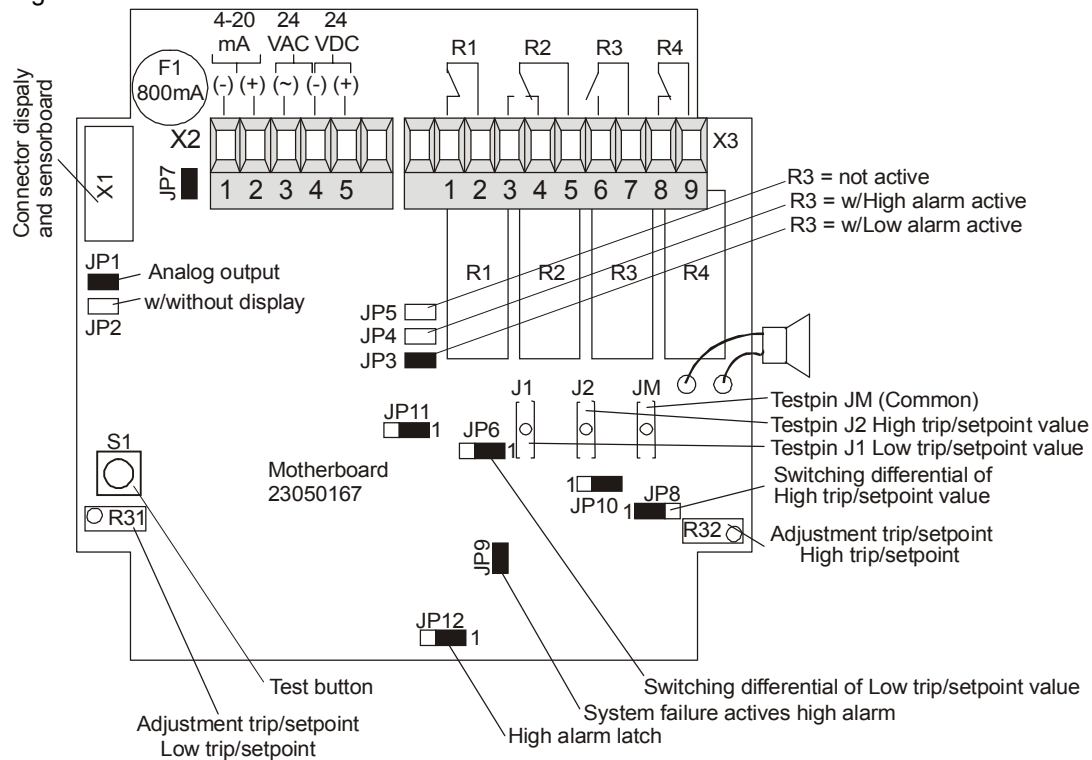
Dimensions

Fig. 3



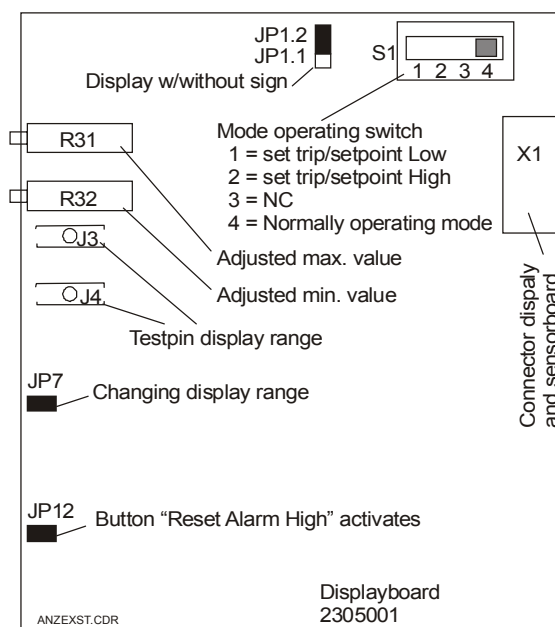
Motherboard

Fig. 4

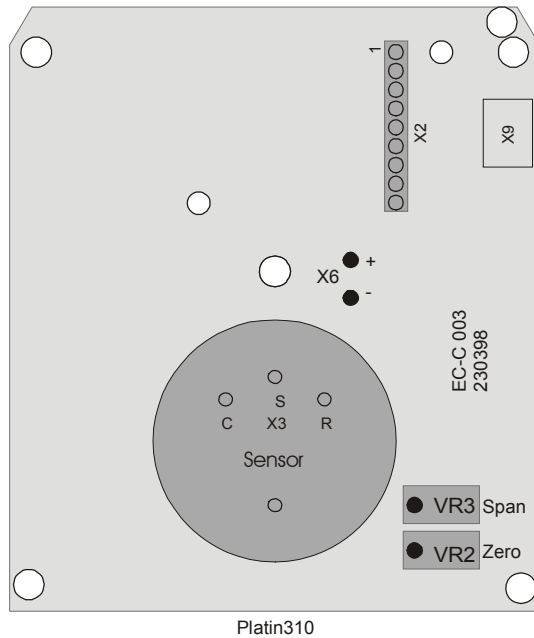


Displayboard

Fig. 5



Sensorboard
Fig. 6



11 Notes and General Information

It is important to read this user manual thoroughly and clearly understand the information and instructions. The PolyGard® single point controller must be used within product specification capabilities. The appropriate operating and maintenance instructions and recommendations must be followed.

Due to ongoing product development, MSR reserves the right to change specifications without notice. The information contained herein is based upon data considered to be accurate. However, no guarantee is expressed or implied regarding the accuracy of this data.

11.1 Intended product application

The PolyGard® NO₂ SPC-1130 single point controller is designed and manufactured for control applications for energy savings and OSHA air quality compliance in commercial buildings and manufacturing plants (i.e., detection and automatic exhaust fan control for automotive maintenance facilities, enclosed parking garages, engine repair shops, warehouses with forklifts, fire stations, tunnels, etc.).

11.2 Installers' responsibilities

It is the installer's responsibility to ensure that all PolyGard® single point controller is installed in compliance with all national and local codes and OSHA requirements. Installation should be implemented only by individuals familiar with proper installation techniques and with codes, standards and proper safety procedures for control installations and the latest edition of the National Electrical Code (ANSI/NFPA70). It is also essential to strictly follow all instructions as provided in the user manual.

11.3 Maintenance

It is recommended that the PolyGard® single point controller performance check be done on a routine schedule. Any performance deviations may be serviced based on needed requirements. Re-calibration and part replacement may be implemented in the field by a qualified individual and with the appropriate tools. Alternatively, the easily removable plug-in transmitter card with the sensor may be returned for service to INTEC Controls.

11.4 Limited warranty

MSR and INTEC Controls warrant the PolyGard® single point controller for a period of two (2) years from the date of shipment against defects in material or workmanship. Should any evidence of defects in material or workmanship occur during the warranty period, MSR or INTEC Controls will repair or replace the product at their own discretion, without charge.

This warranty does not apply to units that have been altered, had repair attempted, or been subjected to abuse, accidental or otherwise. The warranty also does not apply to units in which the sensor element has been overexposed or gas poisoned. The above warranty is in lieu of all other express warranties, obligations or liabilities.

This warranty extends only to the PolyGard® single point controller. MSR and INTEC Controls shall not be liable for any incidental or consequential damages arising out of or related to the use of the PolyGard® single point controller.

11.5 Return instructions

If the PolyGard® single point controller needs to be returned to INTEC Controls for service, an RMA number must be obtained prior to sending.